Proposed Plan to Select a Remedy to Clean Up Soils at the National Aeronautics and Space Administration Jet Propulsion Laboratory, Pasadena, California

Final

April 25, 2001

PUBLIC MEETING AND PUBLIC COMMENT PERIOD

The National Aeronautics and Space Administration (NASA)[1] will hold two public meetings to discuss the proposed cleanup of soils at its Jet Propulsion Laboratory (JPL) in Pasadena, California. The public meetings will be held at the following location and on the following dates:

Von Karman Auditorium
NASA Jet Propulsion Laboratory
4800 Oak Grove Drive
Pasadena, CA 91101

May 12, 2001

Information forum:	1:00 p.m.–4:00 p.m.
Summary presentation:	2:30 p.m.
Formal comment session:	3:00 p.m.

May 14, 2001

Information forum:	6:00 p.m.–9:00 p.m.
Summary presentation:	7:30 p.m.
Formal comment session:	8:00 p.m.

During the "information forums," the public will have the opportunity to speak with NASA and federal and local regulatory agency representatives on a one-on-one basis about the proposed cleanup actions. Following the summary presentations, attendees can provide formal questions and comments to these representatives which will be included in a meeting transcript and become part of the final decision made for soil cleanup at JPL.

The public is encouraged to review and comment on the Proposed Plan. Final decisions regarding cleanup will be made after public comments have been received and considered. The public comment period is May 7 through June 11, 2001. If requested, NASA may consider extending the public comment period. Written comments and requests for extension of the comment period should be mailed or e-mailed to Mr. Peter Robles, Jr. at the addresses provided on page 6, or brought to the public meeting.

INTRODUCTION

NASA is requesting public comment on this *Proposed Plan*[2] to remove chemicals from the soils beneath JPL in Pasadena, California. The chemicals are solvents that are known as *volatile organic compounds (VOCs)*. NASA is proposing to remove the VOCs from the zone of soil located between the ground surface and the groundwater table (this zone of soil is called the *vadose zone*). These chemicals have a potential to migrate to groundwater at the site.

This Proposed Plan describes the chemicals in soil vapors identified at the site and evaluates two cleanup or *remediation* alternatives. The two alternatives are: (1) *no further action (NFA)* and (2) *soil vapor extraction (SVE)*. The preferred remedial alternative, SVE, and the rationale for its selection are also discussed.

This Proposed Plan summarizes information that can be found in greater detail in the *Remedial Investigation (RI)* report, which includes the *Human Health Risk Assessment (HHRA)* and the *Ecological Risk Assessment (ERA)*, and the *Feasibility Study (FS)* report. The *Administrative Record*, which contains a complete record of associated site information, is maintained at JPL. Copies of the Administrative Record are also available at the *information repositories* listed in the box on page 6.

NASA, with regulatory oversight, is the lead federal agency for remedial actions at JPL. NASA is performing the investigation and cleanup work at JPL pursuant to the law known as the *Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)* also known as "Superfund." CERCLA requires that facilities on the *National Priorities List (NPL)* comply with all applicable federal, state, and local laws concerning *removal* and *remedial actions*.

NASA is working in cooperation with the State of California Department of Toxic Substances Control (DTSC), the Regional Water Quality Control Board (RWQCB) Los Angeles Region, and the U.S. Environmental Protection Agency (U.S. EPA) in the selection of the final remedial action for vadose zone soils at JPL. The final remedial action will be selected after the public comment period has ended and the information submitted during that time has been reviewed and considered.

Preferred Remedial Alternative

The preferred remedial alternative for soils located between the ground surface and the groundwater table (vadose zone soils) at the JPL site is based on an evaluation of results from sampling and analyzing soils and soil vapors at the site. Analytical results showed no risks to humans or plant and animal life from the chemicals known as *volatile organic compounds (VOCs)* present in soils. However, the VOCs were detected at elevated concentrations in soil-vapor samples beneath the north-central part of the site at depths extending to the water table. These VOCs have the potential to migrate to the *groundwater* at the site. Therefore, SVE is the preferred remedial alternative to remove the VOCs and prevent them from migrating to groundwater.

[1] A list of acronyms and abbreviations is on page 6.
[2] Definitions of *italicized* words are in a glossary on page 7.

The preferred remedial alternative presented in this Proposed Plan may be modified based on comments received during the public comment period. All public comments received during the comment period will be responded to in a *Responsiveness Summary*, which will be included as part of the *Record of Decision (ROD)*. The ROD will officially state the specific remedial action that will be implemented for the vadose zone soils at JPL. On-site groundwater at JPL, as well as off-site groundwater adjacent to JPL, will be addressed in a separate Proposed Plan at a later date.

SITE BACKGROUND

NASA JPL is located between the city of LaCanada-Flintridge and the unincorporated city of Altadena, near Pasadena, California. Figure 1 is a map of JPL's location between Altadena and LaCanada-Flintridge.

JPL comprises about 176 acres of land and more than 150 buildings and other structures. Most of the northern half of JPL is not developed because of steeply sloping terrain. The main developed area is the southern half of the site. The northeastern part of JPL is currently used for project support, testing, and storage. The southwestern part is used mostly for administrative, management, laboratory, and project functions.

Various chemicals have been used and chemical waste materials generated at JPL during its operational history. These include solvents, solid and liquid rocket propellants, cooling tower chemicals, and laboratory wastes.

During the 1940s and 1950s, many buildings at JPL maintained seepage pits to dispose of liquid and solid wastes collected from drains and sinks within the buildings. The seepage pits were designed to allow liquid wastes to seep into the surrounding soil.

These wastes may have contained VOCs that are currently found in the *groundwater* at JPL. In the late 1950s and early 1960s, a sewer system was installed and the use of seepage pits was discontinued.

Results of an investigation in 1990 revealed the presence of VOCs in soil vapor and in the groundwater aquifer at levels exceeding drinking water standards. In October 1992, JPL was placed on the U.S. EPA's NPL and became a CERCLA site.

SITE CHARACTERISTICS

During characterization studies of JPL, the following four VOCs were detected frequently at elevated concentrations in soil-vapor samples: carbon tetrachloride (CCl_4), 1,1,2-trichloro-1,2,2-trifluoroethane (Freon™ 113); trichloroethene (TCE); and 1,1-dichloroethene (DCE). These compounds were generally located beneath the north-central part of JPL, and were detected in soil vapors at depths extending to the water table, which ranges up to 200 feet or more below ground surface.

The total mass of these VOCs in vadose zone soils at JPL was estimated to be no greater than 5,040 pounds.

Although perchlorate has been identified as a potential *chemical of concern* (COC) in groundwater, it is not a COC for vadose zone soils at JPL. Perchlorate moves through the vadose zone quickly until it reaches groundwater, making it unlikely to be found in the vadose zone soils. Therefore, issues relating to perchlorate will be addressed in the remedial action documentation for groundwater at JPL.

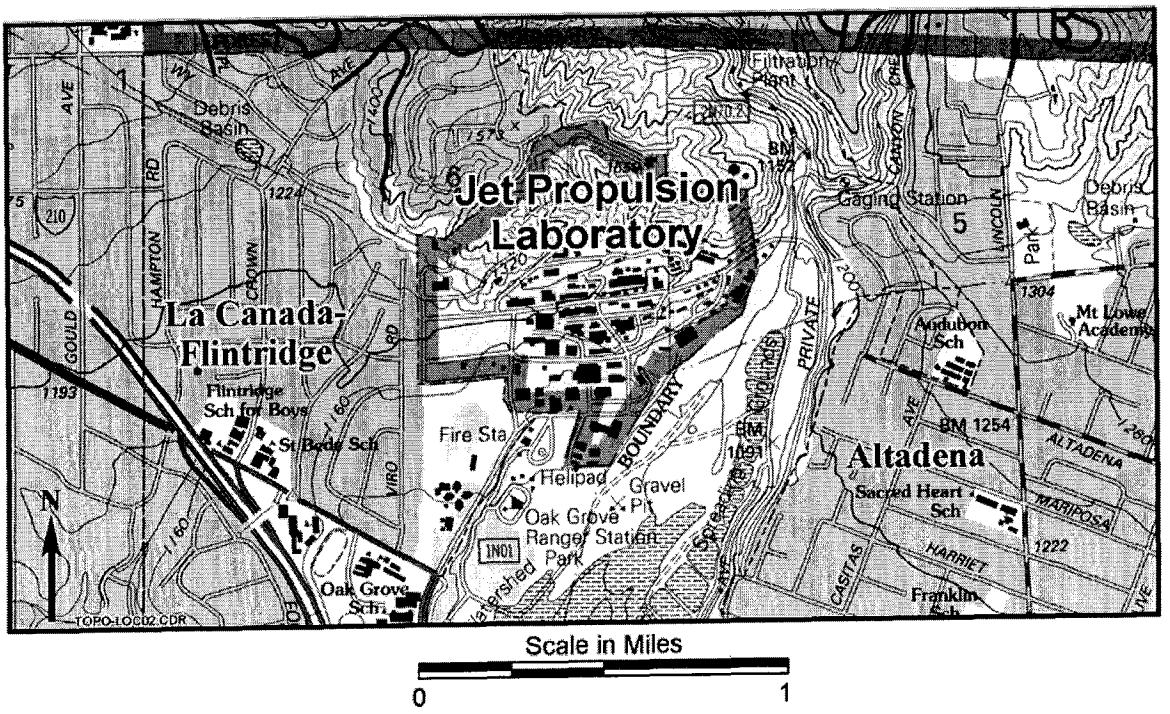

FIGURE 1. Location of Jet Propulsion Laboratory

SITE STUDIES AND RESULTS

Data collection and data analysis methods, assumptions, and results presented in detail in the RI report are summarized below.

Collection and Analysis of Site Data

Soil-vapor samples were collected and analyzed for VOCs, and soil samples were collected and analyzed for a variety of chemical compounds, including metals, polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (PAHs), petroleum hydrocarbons, and other semi- and nonvolatile compounds.

Four VOCs (CCl_4, Freon™ 113, TCE, and DCE) were detected at elevated concentrations in soil-vapor samples. Soil vapor data from the RI suggest that these compounds form a VOC *plume* located in the central part of JPL. The plume encompasses about 45 acres on JPL property, and ranges in depth from about 50 feet below ground surface to the water table (about 200 feet below ground surface).

The potential for transport of VOCs to groundwater at JPL was confirmed by the presence of VOC vapors at the vadose zone–groundwater interface. Semi- and nonvolatile compounds in soil were not found at concentrations requiring remediation.

Human Health Risk Assessment

As part of the RI, NASA conducted an HHRA to determine the need for action to protect human health. The HHRA examined two measures of risk: cancer risk and non-cancer risk.

The HHRA assessed risks associated with human exposure to surface soils, which represents the only direct human exposure route. To assess these risks, the HHRA used chemical concentrations measured in the upper 15 feet of soil and VOC concentrations measured in the upper 30 feet of soil vapor. Conservative assumptions were used to calculate risks that are protective of human health. Exposure parameters included both commercial and residential land use scenarios.

The results of the HHRA showed that the risks associated with vadose zone soils were negligible and were below regulatory threshold guidelines. In addition, the VOCs detected in soil vapor samples did not cause unacceptable risk to humans.

Ecological Risk Assessment

NASA conducted a screening-level ERA as part of the RI to determine the need for action to protect the environment. The deer mouse and the American kestrel were used as indicator species because they are relatively high on the food chain and, therefore, generally have higher exposures to chemicals in the environment.

The ERA concluded that no ecological risks from direct exposures to chemicals in the soil are expected.

SUMMARY OF SITE RISKS

Although human health as well as plant and animal life are not at risk from contact with soils located at JPL, data obtained during the RI indicate that certain VOCs are present in the vadose zone soils and groundwater. Therefore, remedial action is proposed to reduce the amount of VOCs in soil to prevent their migration to groundwater.

PILOT TESTING

An SVE pilot test was initiated at JPL in April 1998. The test involves extraction of soil vapor from one SVE well located at the approximate center of the area with the highest VOC levels. At least 200 lb of VOCs were removed during the pilot test. Results of the test indicate that SVE is a feasible option for remediation of VOCs in soils.

REMEDIAL ACTION OBJECTIVES

Remedial action objectives (RAOs) were established to allow identification and screening of alternatives for soil remediation that would prevent unacceptable levels of chemicals in soil vapors from migrating into groundwater. Development of RAOs to protect human health and ecological receptors from exposure to soils were not needed because the HHRA determined that direct exposure to soils does not pose risks to humans, and the ERA concluded that no ecological risks from chemicals in soil exist. However, because groundwater is an environmental resource that must be protected, an RAO to protect groundwater was required.

The determination of RAOs includes consideration of *applicable or relevant and appropriate requirements (ARARs)*. Based on these requirements, the RAO is to prevent, to the extent practicable, migration of VOCs to groundwater to protect an existing drinking water source.

SUMMARY OF REMEDIAL ALTERNATIVES

Two potential alternatives were evaluated for meeting the RAO: Alternative 1, NFA; and Alternative 2, SVE. Both alternatives include soil vapor monitoring under the existing monitoring program at JPL to assess VOC concentration trends over time. Alternative 2, SVE, is the preferred alternative.

Alternative 1: No Further Action

The *National Oil and Hazardous Substances Pollution Contingency Plan (NCP)* requires that the NFA alternative be evaluated to establish a baseline against which to compare and evaluate other alternatives.

Under Alternative 1, NFA, no remediation would be implemented. A soil-vapor monitoring program, currently in place, would be used to track concentrations and aerial extent of VOCs in soil vapor over time. The monitoring program consists of collection and analysis of soil vapor samples from existing soil-vapor monitoring wells for five years. If VOC levels continue to decrease and/or remain stable, the frequency may be reduced to semiannual or annual before the end of the five-year period. At the end of the five-year period, sampling will either be switched to annual or ended, depending on data from the first five years.

Alternative 2: Soil Vapor Extraction

Under Alternative 2, VOCs in vadose zone soils would be remediated using SVE technology. SVE is a two-step treatment process. In the first step, VOCs are removed from soil vapors by a vacuum applied to an underground well. In the second step, the

VOC vapors are treated to prevent their release to the atmosphere. The U.S. EPA has identified SVE as a presumptive remedy for sites with VOCs present in soil. A presumptive remedy is a technology that is commonly used to clean up sites similar to JPL and has been given a special status by U.S. EPA. Moreover, SVE was shown to be effective in a pilot study at JPL.

The proposed SVE system would utilize up to five vapor extraction wells and five extraction and vapor treatment systems. The new wells would be similar to the existing pilot well. The extraction and treatment systems would be operated until VOCs in soil vapor have been reduced to an agreed-upon level. The criteria for discontinuing operation of the SVE systems will be based on compliance with the RAO.

Alternative 2, SVE, also includes the same soil-vapor monitoring program as described for Alternative 1, NFA. Results from the soil-vapor analysis would be used to determine the extent of remediation, if operations should be adjusted, or if a new approach must be taken at some point in the remediation. Adjustments include shutting down extraction wells or altering specific extraction wells to enhance remediation. If VOC levels decrease, sampling frequencies would be reduced.

When operation of the SVE system is no longer cost-effective and/or necessary to reduce the potential migration of VOCs to groundwater, vapor monitoring would be implemented for a period of time to evaluate compliance with the RAO. Subsequently, after demonstrating that the RAO has been achieved, NASA would pursue site closure.

EVALUATION OF ALTERNATIVES AND SELECTION OF THE PREFERRED ALTERNATIVE

Nine evaluation criteria were developed by the U.S. EPA under the NCP for evaluation of remedial action alternatives. They are categorized into three groups: threshold criteria, primary balancing criteria, and modifying criteria, as follows:

Threshold Criteria

- ❑ Overall Protection of Human Health and the Environment
- ❑ Compliance with ARARs

Primary Balancing Criteria

- ❑ Long-Term Effectiveness and Permanence
- ❑ Reduction of Toxicity, Mobility, or Volume of Contaminants
- ❑ Short-Term Effectiveness
- ❑ Implementability
- ❑ Cost

Modifying Criteria

- ❑ State Acceptance
- ❑ Community Acceptance.

The threshold criteria must be satisfied in order for an alternative to be eligible for selection. The primary balancing criteria are used to weigh major tradeoffs among alternatives. The modifying criteria are generally taken into account after the public comment period has ended and all comments have been reviewed and considered (in this case, by NASA) to determine if the preferred alternative remains the most appropriate remedial action.

As part of the FS Report, both remedial alternatives have undergone detailed evaluation and analysis using these evaluation criteria.

Threshold Criteria

Overall Protection of Human Health and the Environment. This criterion assesses whether a remedial alternative provides adequate public health and environmental protection and describes how health and environmental risks posed by the site will be eliminated, reduced, or controlled through treatment, engineering controls, or other means.

The HHRA determined that direct exposure to soils at JPL does not pose risks to humans, and the ERA concluded that no ecological risks from the soils exist. Thus, both Alternative 1, NFA, and Alternative 2, SVE, are protective of human health in terms of exposure to chemicals through direct contact with soils. However, if not removed, VOCs in the vadose zone may migrate to groundwater. Because of this potential migration, Alternative 1 is not protective of groundwater. Under Alternative 2, the amount of VOCs that will migrate to groundwater is reduced. In addition, treatment of the SVE off-gas stream further protects the environment by removing VOCs before the off-gas stream is released into the atmosphere.

Compliance with ARARs. Compliance with ARARs addresses whether a remedial action alternative meets all related federal and state environmental statutes and requirements. An alternative must comply with ARARs or be covered by a waiver to be acceptable.

The FS contains a complete evaluation of ARARs that may apply to the JPL site. These requirements include the Safe Drinking Water Act; various resolutions, guidance documents, and plans set forth by the RWQCB; the Federal Facilities Compliance Act; Executive Order 11988 (Protection of Floodplains); the Archaeological Resources Protection Act; the National Historic Preservation Act; the Clean Air Act; various regulations set forth by the South Coast Air Quality Management District; and the Resource Conservation and Recovery Act. Additionally, the National Environmental Policy Act (NEPA) is being addressed concurrently with this Proposed Plan in a separate document, which will be made available at the information repositories (see page 6) and incorporated into the ROD.

Alternative 1, NFA, does not meet chemical-specific ARARs because, under this alternative, VOCs are left in place, and groundwater at JPL is not protected. Alternative 2, SVE, complies with all identified ARARs and reduces migration of soil vapors containing VOCs into the groundwater. Since Alternative 1 does not meet the Threshold criteria, it will not receive further consideration in the Primary Balancing criteria because it is not a viable option for meeting RAOs at JPL.

Primary Balancing Criteria

Long-Term Effectiveness. Long-term effectiveness addresses the ability of a remedial alternative to maintain reliable protection of human health and the environment over time, after RAOs have been accomplished.

Alternative 2, SVE, is effective for the long term. The SVE process permanently removes VOCs from vadose zone soils through a vacuum applied to underground wells that remove VOC vapors from the soil. The vapors are then treated to prevent their release to the atmosphere. Because chemicals are permanently removed from the soil, existing and future risks to groundwater are reduced. After remediation is complete, residual VOCs are not expected to further migrate to groundwater. Thus, long-term effectiveness is achieved.

Reduction of Toxicity, Mobility, or Volume of Contaminants. The evaluation of this criterion addresses the statutory preference for selecting remedial actions that employ treatment technologies that permanently and significantly reduce toxicity, mobility, or volume of chemicals in soil or soil vapor.

Alternative 2, SVE, permanently and irreversibly removes VOCs from vadose zone soils. Thus, Alternative 2 reduces the volume and mobility of chemicals in soil at JPL. The results of the pilot study, during which over 200 lb of VOCs have been removed from a single pilot extraction well, show that the extent of VOC removal can be significant.

Short-Term Effectiveness. The evaluation of short-term effectiveness addresses how well human health and the environment are protected from impacts during the construction and implementation of a remedial alternative.

Alternative 2, SVE, presents minimal risks to workers, the public, or the environment. SVE systems are designed so that extraction wells and associated piping are under vacuum. The VOCs in the extracted air will be removed by the aboveground treatment system in accordance with state and local regulations.

Implementability. Evaluation of implementability addresses the technical and administrative feasibility of implementing an alternative, including an evaluation of the availability of technologies, services, and materials required during implementation.

Alternative 2, SVE, is a common remediation process for treatment of VOCs in soils. Equipment is readily available from commercial sources and does not require specialized knowledge for installation. Further, installation and operation of SVE systems require fewer engineering controls than many other remediation technologies and generally entail no foreseeable difficulties for approval by regulatory agencies.

Cost. Evaluation of cost addresses the total cost of the remedial action, including capital costs and operation and maintenance (O&M) costs. Total costs are given in today's dollars, and represent net *present worth value.*

Costs associated with Alternative 2, SVE, include installation and operation of up to five extraction wells and five off-gas extraction and treatment systems, as well as soil vapor monitoring. The new extraction wells will be similar in construction to the existing pilot test extraction well. O&M costs for Alternative 2 include operation and maintenance of the SVE systems and the soil-vapor monitoring program. Soil-vapor monitoring costs are assumed to be the same as for Alternative 1. Total present worth costs for Alternative 2 are estimated to be $3,735,000.

Modifying Criteria

State Acceptance. Evaluation of this criterion addresses the apparent acceptability of the alternative to State of California regulatory agencies. The evaluation of state acceptance presented in the FS report is qualitative and will be fully addressed during the public comment period and preparation of a ROD.

Community Acceptance. Evaluation of this criterion addresses the apparent acceptability of the alternative to the community. The evaluation of community acceptance presented in the FS report is qualitative and will be fully addressed during the public comment period and preparation of a ROD.

SUMMARY OF THE PREFERRED ALTERNATIVE

Based on the evaluation of threshold and primary balancing criteria, Alternative 2 (i.e., SVE) is the most effective remedial approach for vadose zone soils at JPL. Alternative 1, NFA, is not appropriate because no protection of groundwater is provided and, therefore, the RAO for the site cannot be met.

Alternative 2, SVE, will reduce and remove VOCs from vadose zone soils. Results from the soil-vapor monitoring program will be used to determine the extent of remediation, if operations should be adjusted, or if a new approach must be taken at some point in the remediation. Adjustments include shutting down extraction wells or altering specific extraction wells to enhance remediation. If VOC levels decrease, sampling frequencies may be reduced, thus making the remediation process more cost-effective.

NASA expects that the preferred alternative will satisfy the statutory requirements in CERCLA section 121(b) that the selected alternative:

- ❑ Be protective of human health and the environment
- ❑ Comply with ARARs
- ❑ Be cost-effective
- ❑ Use permanent solutions and alternative treatment technologies to the maximum extent practicable
- ❑ Satisfy the statutory preference for treatment as a principal element, or justify not meeting the preference.

COMMUNITY RELATIONS AND TECHNICAL INFORMATION CONTACT

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INFORMATION REPOSITORIES

Altadena Public Library
600 E. Mariposa Ave.
Altadena, CA 91001
(626) 798-0833

LaCanada-Flintridge Public Library
4545 Oakwood Ave.
LaCanada-Flintridge, CA 91011
(818) 790-3330

Pasadena Central Library
285 E. Walnut St.
Pasadena, CA 91101
(626) 744-4052

ACRONYMS AND ABBREVIATIONS

ARAR	applicable or relevant and appropriate requirement
CCl_4	carbon tetrachloride
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COC	chemical of concern
DCE	dichloroethene
DTSC	Department of Toxic Substances Control
ERA	ecological risk assessment
Freon™ 113	1,1,2-trichloro-1,2,2-trifluoroethane
FS	feasibility study
HHRA	human health risk assessment
JPL	Jet Propulsion Laboratory
NASA	National Aeronautics and Space Administration
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NEPA	National Environmental Policy Act
NFA	no further action
NPL	National Priorities List
O&M	operation and maintenance
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
RAO	remedial action objective
RI	remedial investigation
ROD	record of decision
RWQCB	Regional Water Quality Control Board
SVE	soil vapor extraction
TCE	trichloroethene
U.S. EPA	U.S. Environmental Protection Agency
VOC	volatile organic compound

GLOSSARY

Administrative Record A collection of all documents used to select and justify remedial alternatives and selected actions. These documents are available for public review.

Applicable or Relevant and Appropriate Requirement (ARAR) A federal or state law or regulation that must be followed during implementation of the remedy selected for site cleanup.

Chemical of Concern (COC) A chemical present at concentrations that exceed regulatory or risk-based thresholds and that pose a threat to human health or the environment.

***Comprehensive Environmental Response, Compensation, and Liability Act* (CERCLA)** Legislation from 1980 that authorizes federal action to respond to the release, or the threat of release, into the environment of hazardous substances, pollutants, or chemicals that may present an imminent or substantial danger to public health or welfare or to the environment. Commonly referred to as Superfund.

Ecological Risk Assessment (ERA) A quantitative process that estimates the risk to flora and fauna from exposure to chemicals at a site.

Feasibility Study (FS) An engineering evaluation of technologies that may be used to remediate a site. An FS evaluates site conditions, technical problems, costs, and human and ecological impacts to determine the effectiveness of potentially applicable technologies.

Groundwater Water beneath the ground surface that fills spaces between soil particles.

Human Health Risk Assessment (HHRA) A quantitative process that estimates the risk to human health from exposure to chemicals at a site.

Information Repository The physical location where a collection of site information is maintained. Documents in an information repository are available for public review.

National Oil and Hazardous Substances Pollution Contingency Plan (NCP) A regulation issued by the U.S. EPA to implement the requirements of CERCLA.

National Priorities List (NPL) A list of uncontrolled hazardous-substance release sites in the United States that are priorities for long-term remedial evaluation and response. The NPL is compiled by the U.S. EPA pursuant to Section 105 of CERCLA.

No Further Action (NFA) A conclusion that no additional site environmental activities, beyond an RI and an FS, are needed. NFA is used as a baseline for comparison with alternative actions identified in an FS.

Plume A zone within a soil or groundwater system where nonnaturally occurring substances are present or where naturally occurring substances are present at elevated concentrations.

Present Worth Value Equivalent dollars now of future expenditures. Present worth value is always less than the future worth value in terms of dollars.

Proposed Plan A document that summarizes information from an RI and an FS report. A proposed plan includes a summary of the environmental conditions at a site, as determined by the RI; describes remedial alternatives for the site; provides a summary explanation of any proposed waivers to ARARs in CERCLA section 121(d)(4); and provides a brief analysis to support the preferred alternative.

Record of Decision (ROD) A document that summarizes how a site will be cleaned up and justifies the selection of the cleanup method chosen.

Remedial Action A final action taken as a permanent remedy. A remedial action may take an extended period of time to implement and may allow specified levels of chemicals to remain.

Remedial Investigation (RI) A field study that includes collecting and analyzing field samples to evaluate the types and concentrations of chemicals present at a site.

Remediate/Remediation Any active or passive environmental activity that results in the reduction of toxicity, mobility, or volume of chemicals at a site.

Removal Action A CERCLA action that removes sources of chemicals from an impacted site. A removal action is often the first response to a release or to a threatened release. It may be either an interim or a final action. A removal action may occur at any time in the CERCLA process.

Responsiveness Summary A document that contains responses to all oral and written public comments received during a public comment period for a CERCLA action.

Soil Vapor Extraction (SVE) A treatment technology in which VOCs are removed from soils by induced airflow.

Vadose Zone The soil zone between the ground surface and the water table.

Volatile Organic Compound (VOC) A chemical compound that contains the element carbon and that readily evaporates into air at room temperature.

NASA Management Office, Jet Propulsion Laboratory
4800 Oak Grove Drive
Pasadena, CA 91101

Public Meeting

A public meeting will be held on

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at

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The public is invited to these meetings to discuss the Proposed Plan to Select a Remedy to Clean Up Soils at the NASA Jet Propulsion Laboratory, Pasadena, California

Comments

- ❑ You may use this card to provide written comments on the Proposed Plan to Select a Remedy to Clean Up Soils at the JPL.
- ❑ Public comments on the Plan will be accepted through June 11, 2001.
- ❑ Please mail your written comments to the address on the reverse side or bring them to public meetings on May 12 and May 14, 2001. (See Proposed Plan for details).

If you would like to receive a written response to your comments, please provide your name and address:

Name: _____
Address: _____
City, State, Zip: _____

Return Address

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